FINDING AND RECOMMENDATION(S)

Submitted by: Conservation Community

Finding: (*i.e., Conclusions reached after investigation and/or evaluation of facts*)

There is a need to perform forest management and fuel reduction in the Lake Tahoe Basin with a consideration of a likelihood of higher levels of ozone for a greater portion of the year as a result of climatic warming.

Background and Supporting Evidence: *(A short statement justifying the Finding and describing desired outcome(s); usually no more than half a page.)*

Research indicates that if present trends are to continue, temperatures throughout the year in the Sierras could rise significantly. Warmer temperatures will translate to higher levels of NOx from the burning of fossil fuels (especially diesel) and the combustion of materials (such as biomass). Ozone formation results from the interaction of hydrocarbons and NOx with UV radiation from the Sun. Ground-level ozone and the resulting smog have deleterious effects on vegetative growth, photosynthetic processes, and the respiratory systems of humans, wildlife, and plants.

Currently, the highest levels of ozone are observed during the summer, but with increased temperatures forecast throughout the year in decades to come, ozone levels will likely increase the most dramatically during the spring and fall, when vegetation is more susceptible to the effects of ozone exposure stress. Trees and other forest vegetation will respond to this increased exposure with stunted growth and be more vulnerable to disease, pest infestation, shallower root systems, and mortality. Ozone injury to Ponderosa Pine and Jeffrey Pine has already been observed in the Tahoe Basin, primarily during years when ozone concentrations were higher than 0.06 ppm during the growing season (May to September), which is lower than the current air quality standards for ozone (0.07 ppm 8-hour and 0.08 ppm 1-hour). The USFS has been monitoring plots established during the 1980's in locations throughout the Basin. Unfortunately, with reduced budgets, the frequency of observation of these plots has decreased from annually to every 3-5 years.

Because ozone formation is closely correlated with increased temperatures, if global warming proceeds as predicted, we may experience higher concentrations of ozone and greater injury to the coniferous trees. As a result, this may

translate to more dead or dying trees and other plants, thereby exasperating fuel loading potential above as well on the forest floor.

As the goal of fuel reduction efforts in the Lake Tahoe Basin is for long term and sustainable solutions in addition to short term solutions, consideration of how higher levels of ozone will affect forest health is an important topic as it will inevitably be essential to preserving life and property in a changing climate. More frequent observations of pine tree plots to assess ozone damage will also provide valuable information to this effort.

Recommendation(s) *(Based upon an analysis of the Finding, the following recommendation(s) should be made to the Governors):*

1. **Ambient levels of ozone, and NOx and Hydrocarbons (the precursors to ozone formation), need to be monitored with performance goals in place that can trigger responses to prevent exceedances. At a minimum, the most protective of either California or Nevada's standards need to be adopted Basin-wide. High priority monitoring sites would be beneficial near communities, transportation corridors, and near any facility that produces emissions with a high proportion of NOx.**

2. **An adequate monitoring program must be implemented to continuously monitor the impacts of ozone on vegetation to allow researchers the opportunity to evaluate the impacts of ozone levels to vegetation over time. We suggest this include re-establishing the annual plot observations at the long-term USFS monitoring sites. This information will be needed by land management agencies and regulators to understand these impacts and adapt future management accordingly.**

Impacts of Implementation: *(The implementation of any Recommendation is likely to have specific impacts. Consider potential consequences related to each of the following areas)*:

Analysis of impacts on the following factors is REQUIRED (Best Estimate):

☐ Cost

There would be some costs associated with the implementation and maintenance of monitoring sites. Ozone monitoring is already

needed to assess human health; opportunities to share sites should be explored.

☐ Funding source
☐ Staffing

☐ Existing regulations and/or laws

This recommendation supports regulations protecting forests and human health with certain ozone standards in the Basin.

Analysis of impacts on the following factors is OPTIONAL:

☐ Operational
☐ Social
☐ Political
☐ Policy
☐ Health and Safety

This recommendation will help inform policy decisions to protect forest health, thereby reducing the tendencies for diseased vegetation that could inevitably increase fire fuel loads.

☐ Environmental
☐ Interagency